$(RCH_2)_nSiX_{(4-n)}$

where n is 1 or 2;

X is a halogen selected from the group consisting of chlorine, bromine, fluorine, and iodine; or an alkoxy selected from the group consisting of methoxy, ethoxy and propoxy substituents; and

R is an alkyl group having at least one but not more than two non-halogenated substituents in the position β to silicon that are electronegative;

and wherein said siloxane polymer contains silanol groups.

REMARKS

Claims 1-23 are presently pending in the application.

Claims 1, 3, 6, 22 and 23 have been amended to more accurately conform to the specification as follows. All of these claims have been amended to replace the phrase "by the release of unsaturated hydrocarbons and protonated byproducts" with "by the elimination of β-substituted alkyl groups" to describe the formation of the SiO_2 - rich films from the siloxane polymer. Support for this phrase may be found in the specification at least at page 8, lines 12-15 and page 10, line 26 to page 11, line 4. In claim 22, the phrase "without fillers" has been deleted and the ratio of p:q has been changed to 1:20 to 1:1.33. Support for this range may be found in the specification at least at page 5, lines 17-18 and page 11, lines 9-11, which teach a ratio of between 5 and 75 silanol (Si-OH) groups per 100 silicon atoms (i.e., 5:100=1:20 and 75:100=1:1.33). Finally, in claim 22, the definitions of m and n have been amended to recite that when n = 1, m may be 0 or 1, and when n = 2, m is 0 such that there are at least two "X" substituents on silicon. Support for this amendment may be found in the specification at least at page 3, lines 18-19. No new matter has been added by these amendments.

In Paper No. 15, the Examiner has rejected claims 1-26 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification. By this amendment, the phrase objected to by the Examiner, "by the release of unsaturated hydrocarbons and protonated byproducts" has been amended to "by the elimination of β-substituted alkyl groups," which is supported in the specification as described above. In claim 22, the phrase "without fillers" has been deleted. Finally, the p:q ratio recited in claim 22 has been amended from "1:5 to 1:1" to "1:20 to 1:1.3," which is supported in the specification as described above. Accordingly, all elements of the claims are now clearly supported in the specification.

Additionally, the Examiner has rejected claim 22 under 35 U.S.C. § 112, second paragraph, as being indefinite with regard to the definitions of m and n. By this amendment, claim 22 has been amended to clearly recite that when n = 1, m may be 0 or 1, and that when n = 2, m is 0. In either case, there are at least two "X" groups on silicon such that a siloxane polymer may be formed by hydrolysis and condensation.

In view of these amendments, Applicants respectfully submit that the pending claims are in compliance with §112, first and second paragraphs. Withdrawal of the rejections under §112 is respectfully requested.

In Paper No. 15, the Examiner has rejected claims 1, 8, 11, 12, 14, 16-18 and 23 under 35 U.S.C. § 102(b) as anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 4,923,775 of Schank ("Schank"). Claims 2, 5, 13 and 15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Schank. Finally, the Examiner has rejected claims 1, 9, 11-13 and 15-19 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,666,830 of Alekna ("Alekna"). Applicants respectfully

traverse these rejections and the arguments in support thereof for the reasons set forth in the Amendment filed September 10, 2001, and for the additional reasons set forth below, and respectfully request reconsideration and withdrawal of the rejections.

Rejections Under §§ 102(b) and 103(a) Based on Schank

Regarding Schank, the Examiner argues that the siloxane polymer allegedly taught by Schank is prepared by the hydrolysis and condensation of a silane having an electronegative substituent in the β-position, and that since the compounds taught by Schank and the claimed compounds are identical, the chemical properties would inherently be the same. As a result, even though the Examiner acknowledges that Schank does not teach thermal lability of the polymers or the release of alkyl groups, she maintains that these properties are allegedly inherently associated with the product, and that the discovery of the claimed property and application are simply finding a new property in an old composition. Further, the Examiner argues that the phrase "thermally labile" does not contain any temperature as a standard, and that the specification does not teach a temperature at which the claimed polymers are considered to be thermally labile. Therefore, although Schank does not set forth the lability element recited in the claims, the Examiner argues that there is nothing in Schank to teach or suggest that the polymers would not be thermally and photo labile, and that because the chemical structures of the claimed siloxanes and those taught by Schank are the same, the Schank polymers would be inherently labile. Finally, the Examiner argues that the siloxanes of Schank will inherently degrade when heated to a sufficient temperature, regardless of their stability at a lower temperature.

Regarding claims 2, 5, 13 and 15, the Examiner again maintains that the Schank siloxanes will inherently have the same properties as the claimed polymers, even though Schank does not teach or suggest that the compounds produce photo or thermally labile siloxane polymers or that these polymers would undergo the transformation required by the claims. Furthermore, the Examiner argues that there is nothing to support Applicants' previous statement that the Schank polymers will be more thermally stable since there is no indication at what temperature thermal lability occurs or at what temperature the siloxane polymer in Schank remains stable.

Applicants respectfully traverse the Examiner's conclusion that the specification does not teach at what temperature the claimed siloxane polymers are considered to be thermally labile. At page 8, line 12, it is taught that "moderate temperature conditions" are required to effect the elimination of the β-substituted alkyl groups. Additionally, the phrase "moderate temperatures" is explained at page 10, lines 27-28 to be temperatures above e.g. 150°C, at which the labile groups are volatilized and the polymers degrade to yield SiO_2-rich films.

In contrast and as explained previously, Schank is directed to high temperature elastomers. Specifically, Schank teaches in column 3, lines 45-48 that the cured silicone overcoatings do not degrade at low or elevated temperatures. One skilled in the art would understand that temperatures of greater than 150 °C, at which the claimed siloxane polymers will degrade, are indeed "elevated temperatures." Therefore, it also would be understood by one skilled in the art that the polymers taught by Schank would remain stable (and hence *not* degrade) at these temperatures. For this reason, the polymers taught by Schank would not have inherently the same properties as the claimed polymers since the properties are explicitly taught to be different, and, consequently, Schank does not teach or suggest all of the claimed elements.

Additionally, the Examiner argues that the polymers of Schank would inherently degrade when heated to a sufficient temperature. The Examiner has not provided a basis for making such a conclusion. In fact, there is nothing in Schank to teach that the polymers would in fact degrade; it is also possible that they would simply decompose. Furthermore, even if, *arguendo*, the polymers of Schank did degrade, there is nothing to teach or suggest that they would eliminate alkyl groups as claimed.

Rejection Under §103(a) Based on Alekna

Regarding Alekna, the Examiner argues that since the β-chloroethyl siloxanes embraced by the claims are the same as those suggested by Alekna, they will inherently have the same properties. The Examiner maintains that while Alekna teaches that the resin can be refluxed between 190 and 230°C, this does not mean that the polymers are not thermally labile at higher temperatures.

However, as explained above, the thermal lability of the claimed siloxane polymers occurs at temperatures greater than 150°C. Since the resin of Alekna can be refluxed between 190 and 230 °C, it clearly must be stable at such a temperature and therefore not labile. Accordingly, the resin of Alekna cannot have inherently the same properties as the claimed polymer, and Alekna does not teach or suggest all elements of Applicants' claimed invention.

In summary, in paragraph 8 of Paper No. 12, the Examiner argues that the phrase "moderate temperature," at which the claimed polymers are thermally labile, is open to interpretation. However, as explained above, the specification adequately explains the meaning

of this phrase and thus clearly distinguishes the claimed polymers over those taught by both Schank and Alekna.

In view of the preceding Amendments, Applicants respectfully submit that the pending claims are in compliance with § 112. In view of the Remarks, it is submitted that the pending claims are patentably distinct from the prior art of record and in condition for allowance. A Notice of Allowance is respectfully requested.

Respectfully submitted,

BARRY ARKLES, et al.

February 25, 2002
(Date)

By: _____

WILLIAM W. SCHWARZE
Registration No. 25,918
AKIN, GUMP, STRAUSS, HAUER & FELD, L.L.P.
One Commerce Square
2005 Market Street, Suite 2200
Philadelphia, PA 19103-7086
Telephone: 215-965-1200
Direct Dial: 215-965-1270
Facsimile: 215-965-1210
E-Mail: wschwarze@akingump.com

WWS/SMK:smk
Enclosures

Mark-Up Version of Claims 1, 3, 6, 22 and 23

1. (Amended) A photo and thermally labile siloxane polymer which undergoes transformation to SiO_2-rich films by the [release of saturated hydrocarbons and protonated byproducts] elimination of β-substituted alkyl groups, obtained from the hydrolysis and condensation polymerization of an organosilane containing an alkyl group substituted in the position β to silicon, the organosilane having the general formula:

$$(RCH_2)_nSiX_{(4-n)}$$

where n is 1 or 2;

X is a halogen selected from the group consisting of chlorine, bromine, fluorine, and iodine; or an alkoxy selected from the group consisting of methoxy, ethoxy and propoxy substituents; and

R is an alkyl group having at least one but not more than two substituents in the position β to silicon that are electronegative;
and wherein said siloxane polymer contains silanol groups.

3. (Amended)) A photo and thermally labile siloxane polymer which undergoes transformation to SiO_2-rich films by the [release of saturated hydrocarbons and protonated byproducts] elimination of β-substituted alkyl groups, obtained from the hydrolysis and condensation polymerization of an organosilane containing a β-substituted alkyl group, the organosilane having the general formula:

$$R_nSiX_{(4-n)}$$

where n is 1 or 2;

X is a halogen selected from the group consisting of chlorine, bromine, fluorine, and iodine; or an alkoxy selected from the group consisting of methoxy, ethoxy and propoxy substituents; and

R is an alkyl group having at least one but not more than two β-substituents that are electronegative and at least one but not more than two α-substituents on the β-substituted

alkyl group, the α-substituent being selected from the group consisting of chlorine, bromine, fluorine, iodine, hydroxy, methoxy, ethoxy, and acetoxy;
and wherein said siloxane contains silanol groups

6. (Amended) A photo and thermally labile siloxane polymer which undergoes transformation to SiO_2-rich films by the [release of saturated hydrocarbons and protonated byproducts] elimination of β-substituted alkyl groups, obtained from the hydrolysis and condensation polymerization of an organosilane containing a β-substituted alkyl group, the organosilane having the general formula:

$$R_nSiX_{(4-n)}$$

where n is 1;

X is a halogen selected from the group consisting of chlorine and bromine, or an alkoxy selected from the group consisting of methoxy and ethoxy substituents; and

R is an ethyl group having at least one but not more than two β-substituents selected from the group consisting of bromine, fluorine, methoxy, and acetoxy and at least one but not more than two α-substituents on the β-substituted ethyl group, the α-substituent being selected from the group consisting of chlorine, bromine, fluorine, hydroxy, methoxy, and acetoxy;
and wherein said siloxane polymer contains silanol groups

22. (Amended) A photo and thermally labile siloxane polymer [without fillers] of the structure $[ClCH_2CH_2SiO(OH)]p[ClCH_2CH_2SiO_{1.5}]q$, in which the ratio of p:q is from [1:5 to 1:1] 1:20 to 1:1.33, which undergoes transformation to SiO_2-rich films by the [release of saturated hydrocarbons and protonated byproducts] elimination of β-substituted alkyl groups, obtained from the hydrolysis and condensation of an organosilane having the general formula:

$$(ClCH_2CH_2)_nR'_mSiX_{(4-n-m)}$$

where n is 1 or 2, and wherein when n = 1, m is 0 or 1 and when n = 2, m is 0;

X is a halogen selected from the group consisting of chlorine, bromine, fluorine, and iodine; or an alkoxy selected from the group consisting of methoxy, ethoxy and propoxy substituents; and

R' is any substituted or unsubstituted alkyl group.

23. (Amended) A photo and thermally labile siloxane polymer which undergoes transformation to SiO_2-rich films by the [release of saturated hydrocarbons and protonated byproducts] <u>elimination of β-substituted alkyl groups</u>, obtained from the hydrolysis and condensation polymerization of an organosilane containing an alkyl group substituted in the position β to silicon, the organosilane having the general formula:

$$(RCH_2)_nSiX_{(4-n)}$$

where n is 1 or 2;

X is a halogen selected from the group consisting of chlorine, bromine, fluorine, and iodine; or an alkoxy selected from the group consisting of methoxy, ethoxy and propoxy substituents; and

R is an alkyl group having at least one but not more than two non-halogenated substituents in the position β to silicon that are electronegative;

and wherein said siloxane polymer contains silanol groups.